Design one way ribbed floor system shown below subjected to partition load of 3kN/m and live load of 5kN/m2 materials used include C-30, S-300 and class I work. Ribbing in the X –direction

5m

6m

7m

Solution

Cross section of ribbed slab

Ribbed spacing

Clear distance

Slab thickness hf

Take the larger of the two df= 60mm For practical case mm and D=300mm

60mm

400

80mm

The rib is to be considered like a T section

be

hf

dw

bw

Considering Second panel S2 (slab2)

Therefore take

Loading

Dead load, self weight =

Floor finishing (cement screed +PVC tile)

Partition load (DL) =

Total dead load (DL) = 1.08+0.404

Live load LL

Design load

**Analysis**

Take into account the variation of load

1. Maximum support moment (for maximum loading case

24.4

5m

6m

3EI/L

3EI/L

Rel. K

6

5

DF

0.55

0.45

-30.11

BM

20.91

+4.14

+5.06

25.97

25.97

24.4

15.74

11.53

21.92

15.74

25.77

11.53

18.52

9.44

1. Maximum span moment for (DL only on second panel)

2.68

6m

10

1.29

20.82

20.33

16.68

2.63

11.53

23.46

10.77

16.68

20.33

-20.33

+11.95

+9.78

8.38

-30.11

0.55

0.45

6

3EI/L

3EI/L

5m

23.46

Rel k

FEM

10

2.68

SFD

2.63

BMD

Design constants

S-300

and c1 =2.5

400mm

60mm

240mm

80mm

For Maximum Span Moment, Mmax =20.82kN.m assuming b=be=400mm

Amount of reinforcement

For maximum support moment Mmax =25.97kN.m

For the negative bending moment consider rectangular beam b=bw =80mm check for d value.

Increase the value of bw =100mm

Use bw =100mm the load increase =25(0.24\*0.02) =0.12kN/m

Moment incremental =

Amount of reinforcement

**Shear reinforcement**

In the vicinity of the support assume supporting beam with to be 300mm. the largest shear at d-distance from face of support (in the case of loading case 1)

Shear capacity of the section

Since  
 provide minimum reinforcement

smax = 0.5d =0.5\*259=129.5mm ≤ 300mm if Vsd ≤ 

Use Φ8 stirrups c/c 130mm

**The transverse reinforcement at topping cross sectional area per rib**

Based on EBCS -2

Spacing

**Longitudinal shear (υsd) per unit length**

**Flange in compression**

Compression under span moment (Mmax) =20.82kN. m

*Therefore it is safe against failure by crushing concrete*